

CLAIMS

- 1 1. A modular shade system comprising:
2 a support structure defining a first area having a length and a width;
3 modular panels, having upper and lower surfaces, mounted to and supported by the support
4 structure, said modular panels covering at least about 80% of the first area, the upper surfaces of the
5 modular panels being exposed surfaces;
6 the modular panels comprising PV panels and supplemental panels; and
7 the supplemental panels providing a feature other than shading and optionally providing shading.
- 1 2. The system according to claim 1 wherein the support structure comprises:
2 a series of generally parallel purlins;
3 beams oriented transversely to said purlins, said purlins secured to and supported by the
4 beams; and
5 columns secured to and supporting said beams, whereby said purlins define the first
6 shading area, the length and width measured parallel to and perpendicular to the purlins.
- 1 3. The system according to claim 1 wherein the supplemental panels comprise light-
2 transmissive panels and wherein light-transmissive panels cover about 0 to 50% of the first area.
- 1 4. The system according to claim 1 wherein the supplemental panels comprise light-
2 transmissive panels and wherein light-transmissive panels cover about 5 to 30% of the first area.
- 1 5. The system according to claim 1 wherein the supplemental panels comprise light-
2 transmissive panels and wherein the light-transmissive panels are placed adjacent to one another along a
3 path parallel to the length.
- 1 6. The shading system according to claim 1 wherein the PV panels are light-transmissive
2 PV panels.

- 1 7. The system according to claim 1 wherein the supplemental panels comprise light-
2 transmissive panels and wherein the PV panels and light-transmissive panels cover at least about 90% of
3 the first area.
- 1 8. The system according to claim 1 further comprising protective panels mounted to the
2 shading system subassembly opposite the lower surfaces of the PV modules.
- 1 9. The system according to claim 8 wherein the protective panels comprise at least one of
2 wire mesh, sheet metal, perforated sheet metal, plastic, perforated plastic, cement board, perforated
3 cement board, and phosphorescent material.
- 1 10. The system according to claim 8 wherein the PV modules and the protective panels are
2 constructed to permit some light to pass therethrough.
- 1 11. The system according to claim 8 wherein the protective panels have a convex lower
2 surface.
- 1 12. The system according to claim 8 wherein the protective panels are perforated.
- 1 13. The system according to claim 8 wherein the PV modules cover at least about 90% of the
2 first area.
- 1 14. The system according to claim 1 wherein the supplemental panels comprise
2 phosphorescent panels to provide passive nighttime illumination beneath support structure.
- 1 15. The system according to claim 1 wherein the supplemental panels comprise planter
2 panels for planting of plants.
- 1 16. The system according to claim 1 wherein the supplemental panels comprise illuminated
2 panels.

1 17. The system according to claim 1 wherein the supplemental panels comprise water
2 collection containers.

1 18. The system according to claim 1 wherein the supplemental panels comprise space cooling
2 elements comprising at least one of spray misters for evaporative cooling, fans, pumps, wetted canvas,
3 water storage containers, tubing, and evaporative spouts.

1 19. The system according to claim 1 further including modular features for multi-
2 functionality and customization.

1 20. The system according to claim 19 wherein said modular features include elements for
2 space cooling comprising at least one of spray, fans, pumps, wetted canvas, water storage containers,
3 tubing, and evaporative spouts.

1 21. The system according to claim 19 wherein said modular features include elements for
2 water collection and drainage.

1 22. The system according to claim 19 wherein said modular features comprise acoustical
2 control panels.

1 23. The system according to claim 19 wherein said modular features comprise at least one of
2 seating elements, planting elements, playground elements, restroom elements, signage elements,
3 antennae modules, payment machines, and stage elements.

1 24. The system according to claim 19 wherein said modular features comprise a rail
2 transportation element.

1 25. The system according to claim 19 wherein said modular features comprise a fuel cell
2 charging system.

1 26. The system according to claim 19 wherein said modular features comprise a hydrogen
2 production device.

1 27. The system according to claim 19 wherein said modular features comprise a hydrogen
2 storage device.

1 28. The system according to claim 19 wherein said modular features comprise inverters for
2 converting dc to ac electricity.

1 29. The system according to claim 19 wherein said modular features comprise electrical
2 wireways.

1 30. The system according to claim 19 wherein said modular features comprise elements
2 which facilitate roller skating, ice skating, car shows, horse riding, housing the homeless, farmers
3 markets, soccer matches, tennis matches, concerts, lightshows, fitness, transportation nodes.

1 31. A photovoltaic assembly comprising:
2 a mounting structure;
3 a PV module, having upper and lower surfaces, supported by the mounting structure; and
4 a protective panel mounted to at least one of the mounting structure and the PV module opposite
5 the lower surface of the PV module.

1 32. The system according to claim 31 wherein the protective panel comprises at least one of
2 wire mesh, sheet metal, perforated sheet metal, plastic, perforated plastic, cement board, perforated
3 cement board, and phosphorescent material.

1 33. The system according to claim 31 wherein the PV module and the protective panel are
2 constructed to permit some light to pass therethrough.

1 34. The system according to claim 31 wherein the protective panel has a convex lower
2 surface.

1 35. The system according to claim 31 wherein the protective panel is perforated.